C 8

```
   OOOOOOOOO     PPPPPPPPPPPP        CCCCCCCCCCCC     OOOOOOOOO     MMM         MMM
   OOOOOOOOO     PPPPPPPPPPPP        CCCCCCCCCCCC     OOOOOOOOO     MMM         MMM
   OOOOOOOOO     PPPPPPPPPPPP        CCCCCCCCCCCC     OOOOOOOOO     MMM         MMM
OOO         OOO  PPP         PPP  CCC              OOO         OOO  MMMMMM   MMMMMM
OOO         OOO  PPP         PPP  CCC              OOO         OOO  MMMMMM   MMMMMM
OOO         OOO  PPP         PPP  CCC              OOO         OOO  MMMMMM   MMMMMM
OOO         OOO  PPP         PPP  CCC              OOO         OOO  MMM   MMM   MMM
OOO         OOO  PPP         PPP  CCC              OOO         OOO  MMM   MMM   MMM
OOO         OOO  PPP         PPP  CCC              OOO         OOO  MMM   MMM   MMM
OOO         OOO  PPPPPPPPPPPP     CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPPPPPPPPPPP     CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPPPPPPPPPPP     CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPP              CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPP              CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPP              CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPP              CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPP              CCC              OOO         OOO  MMM         MMM
OOO         OOO  PPP              CCC              OOO         OOO  MMM         MMM
   OOOOOOOOO     PPP                 CCCCCCCCCCCC     OOOOOOOOO     MMM         MMM
   OOOOOOOOO     PPP                 CCCCCCCCCCCC     OOOOOOOOO     MMM         MMM
   OOOOOOOOO     PPP                 CCCCCCCCCCCC     OOOOOOOOO     MMM         MMM
```

```
_$2

Sym
---
ALL

ASC

BOD
BOD
BOD
BOD
BOD
BOD
BOD
BOD
BUG
BYP
CAN
CAN
CAN
CHE
CHE

CLU
CLU
CLU
CLU
CLU
CLU
CLU

CLU
CLU
CLU
CLU
CLU
CLU
CLU

CLU
CLU
```

```
**FILE**ID**CLUSMSG                                   M 4




  CCCCCCCC  LL          UU      UU    SSSSSSSS  MM      MM    SSSSSSSS    GGGGGGGG
  CCCCCCCC  LL          UU      UU    SSSSSSSS  MM      MM    SSSSSSSS    GGGGGGGG
CC          LL          UU      UU  SS          MMMM  MMMM  SS          GG
CC          LL          UU      UU  SS          MMMM  MMMM  SS          GG
CC          LL          UU      UU  SS          MM  MM  MM  SS          GG
CC          LL          UU      UU  SS          MM  MM  MM  SS          GG
CC          LL          UU      UU    SSSSSS    MM      MM    SSSSSS    GG
CC          LL          UU      UU    SSSSSS    MM      MM    SSSSSS    GG
CC          LL          UU      UU          SS  MM      MM          SS  GG  GGGGGG
CC          LL          UU      UU          SS  MM      MM          SS  GG  GGGGGG
CC          LL          UU      UU          SS  MM      MM          SS  GG      GG      ....
CC          LL          UU      UU          SS  MM      MM          SS  GG      GG      ....
  CCCCCCCC  LLLLLLLLLL  UUUUUUUUUU  SSSSSSSS    MM      MM  SSSSSSSS      GGGGGG        ....
  CCCCCCCC  LLLLLLLLLL  UUUUUUUUUU  SSSSSSSS    MM      MM  SSSSSSSS      GGGGGG        ....

LL              IIIIII      SSSSSSSS
LL              IIIIII      SSSSSSSS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II      SS
LL                II        SSSSSS
LL                II        SSSSSS
LL                II              SS
LL                II              SS
LL                II              SS
LL                II              SS
LLLLLLLLLL      IIIIII    SSSSSSSS
LLLLLLLLLL      IIIIII    SSSSSSSS
```

```
MODULE  OPC$CLUSMSG      (
                          LANGUAGE (BLISS32),
                          IDENT = 'V04-000'
                         ) =

!****************************************************************************
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!*                                                                          *
!****************************************************************************

!++
! FACILITY:
!
!       OPCOM
!
! ABSTRACT:
!
!       This module contains the specialized logic to service
!       a particular type of request sent by a user to OPCOM.
!
! Environment:
!
!       VAX/VMS operating system.
!
! Author:
!
!       CW Hobbs
!
! Creation date:
!
!       16-JUL-1983
!
! Revision history:
!
!       V03-006 CWH3006         CW Hobbs                        24-May-1984
!               REPLY /USER etc. stopped working in a non-cluster system
!               because a check in CWH3169 was being applied to clm__rpybrd_local
!               messages.  Move the check inside the block which excludes
!               local node replies.
```

```
0058 0 !
0059 0 !        V03-005 CWH3005         CW Hobbs                        16-May-1984
0060 0 !                Fix RSH0112 so that the receiving node will also see that
0061 0 !                no unformatted text was sent.
0062 0 !
0063 0 !        V03-004 CWH3169         CW Hobbs                        5-May-1984
0064 0 !                Second pass for cluster-wide OPCOM:
0065 0 !                 - Add CLM_L_CSID to clm message header, and make the embedded
0066 0 !                   RQCB distinct, rather than overlaying on top of the header.
0067 0 !                 - If an input message has a standard header, then redo the
0068 0 !                   header so that the local time is first, and put the remote
0069 0 !                   time at the end.
0070 0 !                 - When a message is received, make sure that the CSID matches
0071 0 !                   a node that we can see.  If not, discard the message.
0072 0 !
0073 0 !        V03-003 RSH0112         R. Scott Hanna          12-Mar-1984
0074 0 !                CLUSMSG_RQCB_SEND / Increase the local buffer size
0075 0 !                and prevent unformatted security auditing messages
0076 0 !                from being sent to other cluster members.
0077 0 !
0078 0 !        V03-002 CWH3002         CW Hobbs                16-Sep-1983
0079 0 !                Add CLUMBX message type, use VM jacket routines
0080 0 !
0081 0 !
0082 0 !--
```

```
1 BEGIN                                                    ! Start of CLUSMSG
1
1 LIBRARY 'SYS$LIBRARY:LIB.L32';
1 LIBRARY 'LIB$:OPCOMLIB';
1
1 FORWARD ROUTINE
1         CLUSMSG_ACK_PLEASE : NOVALUE,                    ! Request an acknowledgement
1         CLUSMSG_CLM_ACK_HANDLER : NOVALUE,               ! Handle an acknowledgement
1         CLUSMSG_CLM_ACK_PLEASE_HANDLER : NOVALUE,        ! Handle a request for an acknowledgement
1         CLUSMSG_CLM_NOTIFY_HANDLER : NOVALUE,            ! Log message and notify operators
1         CLUSMSG_CONV_CLM_RQCB,                           ! Convert a CLMRQCB structure to an RQCB
1         CLUSMSG_HANDLER : NOVALUE,                       ! Main level, check message and dispatch
1         CLUSMSG_RQCB_SEND,                               ! Convert RQCB to CLMRQCB and send to cluster
1         CLUSMSG_STATE_SEND;                              ! Send current state to cluster node(s)
1
1 EXTERNAL ROUTINE
1         !
1         ! Miscellaneous routines
1         !
1         ALLOCATE_DS,
1         CLUSCOMM_SEND,                                   ! Send message to the cluster
1         CLUSUTIL_CONFIGURE,                              ! Configure the club membership
1         CLUSUTIL_FIND_NOD_BY_CSID,                       ! Find a NOD block by its CSID
1         CLUSUTIL_NODE_ACTIVATE,                          ! Make a node active
1         CLUSUTIL_NODE_MESSAGE,                           ! Tell operators of a node activity
1         DEALLOCATE_RQCB,                                 ! Release an RQCB
1         DUMP_LOG_FILE,                                   ! Write a string to the log file
1         IMPLICITLY_CANCELED,                             ! Look for implicitly canceled requests
1         IMPLIED_CANCEL,                                  ! Cancel queue of requests to be canceled
1         IMPLIED_DISABLE,                                 ! Disable stale operators
1         LOG_MESSAGE,                                     ! Write a message to the logfile
1         NOTIFY_LISTED_OPERATORS,                         ! Send messages to operators
1         SHARE_FAO_BUFFER,                                ! Format an FAO string
1         WRITE_LOG_FILE,                                  ! Write a string to the log file
1         !
1         ! Handlers for cluster messages (CLMs)
1         !
1         CANCEL_CLM_HANDLER              : NOVALUE,       ! Cancel request from remote
1         CLUSREPLY_RPYBRD_HANDLER        : NOVALUE,       ! Broadcast from remote REPLY command
1         CLUSREPLY_RPYBRD_LOCAL_HANDLER  : NOVALUE,       ! Broadcast from local REPLY command
1         CLUSREPLY_RPYNOT_HANDLER        : NOVALUE,       ! Notification from remote REPLY command
1         OPERUTIL_CLM_IMP_DISABLE        : NOVALUE,       ! Implicitly disable a remote operator
1         OPRENABLE_CLM_HANDLER           : NOVALUE,       ! Enable/Disable remote operator
1         REPLY_CLM_HANDLER               : NOVALUE,       ! Remote reply (/PEND, /TO) handler
1         REQUEST_CLM_HANDLER             : NOVALUE,       ! Remote request handler
1         REQUEST_CLM_CHECK_HANDLER       : NOVALUE,       ! Remote check request handler
1         SHUTDOWN_CLM_HANDLER            : NOVALUE;       ! Shutdown ordered by remote handler
1
1 EXTERNAL
1         LCL_NOD         : $ref_bblock,
1         LCL_CSID        : LONG,
1         NOD_HEAD        : VECTOR [2, LONG],
1         OCD_VECTOR      : VECTOR,                        ! OCD list heads
1         GLOBAL_STATUS   : BITVECTOR;
1
1 EXTERNAL LITERAL
1         MCB_K_TYPE,
;  141          0140  1          RQCB_K_TYPE,
;  142          0141  1          MIN_SCOPE,                                     ! Minimum scope value
;  143          0142  1          MAX_SCOPE;                                     ! Maximum scope value
```

```
1 GLOBAL ROUTINE CLUSMSG_ACK_PLEASE (NOD : $ref_bblock) : NOVALUE =                %SBTTL 'clusmsg_ack_please'
1
1 !++
1 ! Functional description:
1 !
1 !       Request an acknowledgement from a remote node.
1 !
1 ! Input:
1 !
1 !       NOD - pointer to NOD structure of the remote node
1 !
1 ! Implicit Input:
1 !
1 !       LCL_NOD - pointer to NOD structure for local node
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       None.
1 !
1 ! Side effects:
1 !
1 !       Message sent to remote.
1 !
1 ! Routine value:
1 !
1 !       None.
1 !--
1
2 BEGIN                                               ! Start of CLUSMSG_ACK_PLEASE
2
2 LOCAL
2     MSG : $bblock [CLMACK_K_SIZE],
2     STATUS;
2 !
2 ! If we have an ack pending, just return to avoid flooding with ack messages.  To resend
2 ! an ack, you must clear this bit before calling this routine.
2 !
2 IF .NOD [NOD_V_ACK_PEND]
2 THEN
2     RETURN;
2 !
2 ! If we have already tried to talk to this guy, let them know
2 !
2 IF .NOD [NOD_V_ACK_ATTEMPTED]
2 THEN
2     CLUSUTIL_NODE_MESSAGE (.NOD, OPC$_NODE_RETRY, FALSE);
2 NOD [NOD_V_ACK_ATTEMPTED] = TRUE;
2 !
2 ! Fill in the ack message header
2 !
2 MSG [CLM_B_RQSTCODE]    = OPC$_X_CLUSMSG;
2 MSG [CLM_B_CLM_CODE]    = CLM__ACKNOWLEDGE_PLEASE;
2 MSG [CLM_B_DS_VERSION]  = CLMACK_K_DS_VERSION;
```

```
;   202        0200  2 MSG [CLM_B_SW_VERSION]  = OPC$K_SW_VERSION;
;   203        0201  2 MSG [CLM_W_LENGTH]      = CLMACK_K_SIZE;
;   204        0202  2 MSG [CLM_W_FILL_1]      = 0;
;   205        0203  2 MSG [CLM_L_CSID]        = .LCL_CSID;
;   206        0204  2 !
;   207        0205  2 ! Fill in the ack message from the local node info
;   208        0206  2 !
;   209        0207  2 MSG [CLMACK_L_CSID] = .LCL_NOD [NOD_L_NODE_CSID];
;   210        0208  2 MSG [CLMACK_L_SYSTEMIDL] = .LCL_NOD [NOD_L_NODE_SYSTEMIDL];
;   211        0209  2 MSG [CLMACK_W_SYSTEMIDH] = .LCL_NOD [NOD_W_NODE_SYSTEMIDH];
;   212        0210  2 !
;   213        0211  2 ! Send the message
;   214        0212  2 !
;   215        0213  2 STATUS = CLUSCOMM_SEND (.NOD [NOD_L_NODE_CSID], CLMACK_K_SIZE, MSG);
;   216        0214  2 !
;   217        0215  2 ! If we were able to send, mark it as pending
;   218        0216  2 !
;   219        0217  2 NOD [NOD_V_ACK_PEND] = .STATUS;
;   220        0218  2
;   221        0219  2 RETURN;
;   222        0220  1 END;


                                                                   .TITLE  OPC$CLUSMSG
                                                                   .IDENT  \V04-000\

                                                                   .EXTRN  ALLOCATE_DS, CLUSCOMM_SEND
                                                                   .EXTRN  CLUSUTIL_CONFIGURE
                                                                   .EXTRN  CLUSUTIL_FIND_NOD_BY_CSID
                                                                   .EXTRN  CLUSUTIL_NODE_ACTIVATE
                                                                   .EXTRN  CLUSUTIL_NODE_MESSAGE
                                                                   .EXTRN  DEALLOCATE_RQCB
                                                                   .EXTRN  DUMP_LOG_FILE, IMPLICITLY_CANCELED
                                                                   .EXTRN  IMPLIED_CANCEL, IMPLIED_DISABLE
                                                                   .EXTRN  LOG_MESSAGE, NOTIFY_LISTED_OPERATORS
                                                                   .EXTRN  SHARE_FAO_BUFFER
                                                                   .EXTRN  WRITE_LOG_FILE, CANCEL_CLM_HANDLER
                                                                   .EXTRN  CLUSREPLY_RPYBRD_HANDLER
                                                                   .EXTRN  CLUSREPLY_RPYBRD_LOCAL_HANDLER
                                                                   .EXTRN  CLUSREPLY_RPYNOT_HANDLER
                                                                   .EXTRN  OPERUTIL_CLM_IMP_DISABLE
                                                                   .EXTRN  OPRENABLE_CLM_HANDLER
                                                                   .EXTRN  REPLY_CLM_HANDLER
                                                                   .EXTRN  REQUEST_CLM_HANDLER
                                                                   .EXTRN  REQUEST_CLM_CHECK_HANDLER
                                                                   .EXTRN  SHUTDOWN_CLM_HANDLER
                                                                   .EXTRN  LCL_NOD, LCL_CSID
                                                                   .EXTRN  NOD_HEAD, OCD_VECTOR
                                                                   .EXTRN  GLOBAL_STATUS, MCB_K_TYPE
                                                                   .EXTRN  RQCB_K_TYPE, MIN_SCOPE
                                                                   .EXTRN  MAX_SCOPE

                                                                   .PSECT  $CODE$,NOWRT,2

                                               0004 00000          .ENTRY  CLUSMSG_ACK_PLEASE, Save R2                     ; 0143
                          5E                18  C2 00002          SUBL2   #24, SP                                          ;
                          52        04      AC  D0 00005          MOVL    NOD, R2                                          ; 0184
```

```
                                                                G 5
OPC$CLUSMSG                                                     16-Sep-1984 01:21:35    VAX-11 Bliss-32 V4.0-742            Page  7
V04-000            clusmsg_ack_please                           14-Sep-1984 12:50:37    [OPCOM.SRC]CLUSMSG.B32;1                  (3)

                         54      2A   A2  E8 00009          BLBS    42(R2), 2$                                       ;
                 0F   2A   A2             01  E1 0000D          BBC     #1, 42(R2), 1$                                   ; 0190
                                          7E  D4 00012          CLRL    -(SP)                                            ; 0192
                            0005823B      8F  DD 00014          PUSHL   #361019                                          ;
                                          52  DD 0001A          PUSHL   R2                                               ;
                      0000G   CF          03  FB 0001C          CALLS   #3, CLUSUTIL_NODE_MESSAGE                        ;
                         2A   A2          02  88 00021 1$:      BISB2   #2, 42(R2)                                       ; 0193
                         6E       0213    8F  B0 00025          MOVW    #531, MSG                                        ; 0197
                      02   AE 00160902    8F  D0 0002A          MOVL    #1444098, MSG+2                                  ; 0199
                                    06    AE  B4 00032          CLRW    MSG+6                                            ; 0202
                      08   AE    0000G    CF  D0 00035          MOVL    LCL_CSID, MSG+8                                  ; 0203
                           50    0000G    CF  D0 0003B          MOVL    LCL_NOD, R0                                      ; 0207
                      0C   AE       2C    A0  D0 00040          MOVL    44(R0), MSG+12                                   ;
                      10   AE       50    A0  D0 00045          MOVL    80(R0), MSG+16                                   ; 0208
                      14   AE       54    A0  B0 0004A          MOVW    84(R0), MSG+20                                   ; 0209
                                          5E  DD 0004F          PUSHL   SP                                               ; 0213
                                          16  DD 00051          PUSHL   #22                                              ;
                                    2C    A2  DD 00053          PUSHL   44(R2)                                           ;
                      0000G   CF          03  FB 00056          CALLS   #3, CLUSCOMM_SEND                                ;
    2A   A2           01          00      50  F0 0005B          INSV    STATUS, #0, #1, 42(R2)                           ; 0217
                                          04 00061 2$:          RET                                                      ; 0220

; Routine Size:  98 bytes,    Routine Base:  $CODE$ + 0000
```

```
1 GLOBAL ROUTINE CLUSMSG_CLM_ACK_HANDLER (BUFFER_DESC : $ref_bblock, CLM : $ref_bblock, LEN) : NOVALUE =
1
1 !++
1 ! Functional description:
1 !
1 !       Handle an acknowledgement from a remote node.
1 !
1 ! Input:
1 !
1 !       BUFFER_DESC -   pointer to message from remote node, including $SNDOPR header
1 !       CLM -           pointer to CLMACK structure
1 !       LEN -           length of LEN
1 !
1 ! Implicit Input:
1 !
1 !       None.
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       None.
1 !
1 ! Side effects:
1 !
1 !       Message sent to remote.
1 !
1 ! Routine value:
1 !
1 !       None.
1 !--
1
2 BEGIN                                         ! Start of CLUSMSG_CLM_ACK_HANDLER
2
2 LOCAL
2     NOD : $ref_bblock,
2     STATUS;
2 !
2 ! Check the version number of the message.  If the message is from any other version,
2 ! simply ignore it.
2 !
2 IF .CLM [CLM_B_DS_VERSION] NEQ CLMACK_K_DS_VERSION
2 THEN
2     RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'CLM__ACK mismatch');
2 !
2 ! Find the NOD structure
2 !
2 NOD = CLUSUTIL_FIND_NOD_BY_CSID (.CLM [CLMACK_L_CSID]);
2 IF .NOD EQL 0
2 THEN
2     RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'no NOD for ACK');
2 !
2 ! Mark the NOD as active
2 !
2 CLUSUTIL_NODE_ACTIVATE (.NOD);
```

```
;  281          0278  2
;  282          0279  2 RETURN;
;  283          0280  1 END;


                                                                              .PSECT  $PLIT$,NOWRT,NOEXE,2

74  61  6D  73  69  6D  20  4B  43  41  5F  5F  4D  4C  43  00000 P.AAB:  .ASCII  \CLM__ACK mismatch\<0><0><0>     ;
                                            00  00  00  68  63  0000F                                                    ;
                                                  010E0011  00014 P.AAA:  .LONG   17694737                                 ;
                                                  00000000' 00018         .ADDRESS P.AAB                                   ;
00  4B  43  41  20  72  6F  66  20  44  4F  4E  20  6F  6E  0001C P.AAD:  .ASCII  \no NOD for ACK\<0><0>           ;
                                                        00  0002B                                                    ;
                                                  010E000E  0002C P.AAC:  .LONG   17694734                                 ;
                                                  00000000' 00030         .ADDRESS P.AAD                                   ;


                                                                              .PSECT  $CODE$,NOWRT,2

                                            0004  00000         .ENTRY  CLUSMSG_CLM_ACK_HANDLER, Save R2          ; 0221
                     52         08   AC   D0  00002         MOVL    CLM, R2                                       ; 0264
                     02         02   A2   91  00006         CMPB    2(R2), #2                                      ;
                                     06   13  0000A         BEQL    1$                                             ;
                             0000'   CF   9F  0000C         PUSHAB  P.AAA                                          ; 0266
                                     11   11  00010         BRB     2$                                             ;
                                0C   A2   DD  00012 1$:     PUSHL   12(R2)                                         ; 0270
               0000G  CF             01   FB  00015         CALLS   #1, CLUSUTIL_FIND_NOD_BY_CSID                   ;
                      52             50   D0  0001A         MOVL    R0, NOD                                        ;
                                     0D   12  0001D         BNEQ    3$                                             ; 0271
                             0000'   CF   9F  0001F         PUSHAB  P.AAC                                          ; 0273
                                04   AC   DD  00023 2$:     PUSHL   BUFFER_DESC                                    ;
               0000G  CF             02   FB  00026         CALLS   #2, DUMP_LOG_FILE                              ;
                                          04  0002B         RET                                                    ;
                                     52   DD  0002C 3$:     PUSHL   NOD                                            ; 0277
               0000G  CF             01   FB  0002E         CALLS   #1, CLUSUTIL_NODE_ACTIVATE                      ;
                                          04  00033         RET                                                    ; 0280

; Routine Size:  52 bytes,    Routine Base:  $CODE$ + 0062
```

```
1 GLOBAL ROUTINE CLUSMSG_CLM_ACK_PLEASE_HANDLER (BUFFER_DESC : $ref_bblock, CLM : $ref_bblock, LEN) : NOVALUE
1
1 !++
1 ! Functional description:
1 !
1 !       Request an acknowledgement from a remote node.
1 !
1 ! Input:
1 !
1 !       BUFFER_DESC -   pointer to message from remote node, including $SNDOPR header
1 !       CLM -           pointer to CLMRQCB structure
1 !       LEN -           length of LEN
1 !
1 ! Implicit Input:
1 !
1 !       None.
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       None.
1 !
1 ! Side effects:
1 !
1 !       Message sent to remote.
1 !
1 ! Routine value:
1 !
1 !       None.
1 !--
1
2 BEGIN                                             ! Start of CLUSMSG_ACK_PLEASE_HANDLER
2
2 LOCAL
2     MSG : $bblock [CLMACK_K_SIZE],
2     NOD : $ref_bblock,
2     STATUS;
2 !
2 ! Check the version number of the message.  If the message is from any other version,
2 ! simply ignore it.
2 !
2 IF .CLM [CLM_B_DS_VERSION] NEQ CLMACK_K_DS_VERSION
2 THEN
2     RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'CLM__ACK mismatch');
2 !
2 ! Tell the requestor everthing we know
2 !
2 CLUSMSG_STATE_SEND (.CLM [CLMACK_L_CSID]);
2 !
2 ! Fill in the ack message header
2 !
2 MSG [CLM_B_RQSTCODE]    = OPC$_X_CLUSMSG;
2 MSG [CLM_B_CLM_CODE]    = CLM__ACKNOWLEDGEMENT;
2 MSG [CLM_B_DS_VERSION]  = CLMACK_K_DS_VERSION;
```

```
;   342          0338  2 MSG [CLM_B_SW_VERSION]  = OPC$K_SW_VERSION;
;   343          0339  2 MSG [CLM_W_LENGTH]      = CLMACK_K_SIZE;
;   344          0340  2 MSG [CLM_W_FILL_1]      = 0;
;   345          0341  2 MSG [CLM_L_CSID]        = .LCL_CSID;
;   346          0342  2 !
;   347          0343  2 ! Fill in the ack message from the local node info
;   348          0344  2 !
;   349          0345  2 MSG [CLMACK_L_CSID] = .LCL_NOD [NOD_L_NODE_CSID];
;   350          0346  2 MSG [CLMACK_L_SYSTEMIDL] = .LCL_NOD [NOD_L_NODE_SYSTEMIDL];
;   351          0347  2 MSG [CLMACK_W_SYSTEMIDH] = .LCL_NOD [NOD_W_NODE_SYSTEMIDH];
;   352          0348  2 !
;   353          0349  2 ! Send the acknowledge message back to from where it came
;   354          0350  2 !
;   355          0351  2 CLUSCOMM_SEND (.CLM [CLMACK_L_CSID], CLMACK_K_SIZE, MSG);
;   356          0352  2 !
;   357          0353  2 ! If we haven't talked to this guy before, then request an acknowledgement from him
;   358          0354  2 !
;   359          0355  2 IF (NOD = CLUSUTIL_FIND_NOD_BY_CSID (.CLM [CLMACK_L_CSID])) NEQ 0
;   360          0356  2 THEN
;   361          0357  3     BEGIN
;   362          0358  3     IF .NOD [NOD_B_STATE] EQL NOD_K_STATE_START
;   363          0359  3     THEN
;   364          0360  4         BEGIN
;   365          0361  4         NOD [NOD_V_ACK_PEND] = FALSE;           ! Clear so that we can
;   366          0362  4         CLUSMSG_ACK_PLEASE (.NOD);              !  request an acknowledgement
;   367          0363  3         END;
;   368          0364  2     END;
;   369          0365  2
;   370          0366  2 RETURN;
;   371          0367  1 END;


                                                                      .PSECT  $PLITS$,NOWRT,NOEXE,2

74 61 6D 73 69 6D 20 4B 43 41 5F 5F 4D 4C 43  00034 P.AAF:  .ASCII  \CLM__ACK mismatch\<0><0><0>                 ;
                              00 00 00 68 63  00043                                                              ;
                                    010E0011  00048 P.AAE:  .LONG   17694737                                     ;
                                    00000000' 0004C         .ADDRESS P.AAF                                       ;


                                                                      .PSECT  $CODE$,NOWRT,2

                                        0004  00000         .ENTRY  CLUSMSG_CLM_ACK_PLEASE_HANDLER, Save R2    ; 0281
                      5E           18  C2  00002         SUBL2   #24, SP                                       ;
                      52      08   AC  D0  00005         MOVL    CLM, R2                                       ; 0325
                      02      02   A2  91  00009         CMPB    2(R2), #2                                     ;
                                   0D  13  0000D         BEQL    1$                                            ;
                           0000'   CF  9F  0000F         PUSHAB  P.AAE                                         ; 0327
                              04   AC  DD  00013         PUSHL   BUFFER_DESC                                   ;
              0000G   CF           02  FB  00016         CALLS   #2, DUMP_LOG_FILE                             ;
                                       04  0001B         RET                                                   ;
                              0C   A2  DD  0001C 1$:     PUSHL   12(R2)                                        ; 0331
              0000V   CF           01  FB  0001F         CALLS   #1, CLUSMSG_STATE_SEND                        ;
                      6E    0113   8F  B0  00024         MOVW    #275, MSG                                     ; 0335
                02    AE 00160902  8F  D0  00029         MOVL    #1444098, MSG+2                               ; 0337
```

```
                                   06   AE  B4 00031          CLRW    MSG+6                                   ; 0340
                     08    AE   0000G   CF  D0 00034          MOVL    LCL_CSID, MSG+8                         ; 0341
                           50   0000G   CF  D0 0003A          MOVL    LCL_NOD, R0                             ; 0345
                     0C    AE      2C   A0  D0 0003F          MOVL    44(R0), MSG+12                          ;
                     10    AE      50   A0  D0 00044          MOVL    80(R0), MSG+16                          ; 0346
                     14    AE      54   A0  B0 00049          MOVW    84(R0), MSG+20                          ; 0347
                                        5E  DD 0004E          PUSHL   SP                                      ; 0351
                                        16  DD 00050          PUSHL   #22                                     ;
                                   0C   A2  DD 00052          PUSHL   12(R2)                                  ;
                  0000G    CF           03  FB 00055          CALLS   #3, CLUSCOMM_SEND                       ;
                                   0C   A2  DD 0005A          PUSHL   12(R2)                                  ; 0355
                  0000G    CF           01  FB 0005D          CALLS   #1, CLUSUTIL_FIND_NOD_BY_CSID           ;
                                        50  D5 00062          TSTL    NOD                                     ;
                                        11  13 00064          BEQL    2$                                      ;
                           02      22   A0  91 00066          CMPB    34(NOD), #2                             ; 0358
                                        0B  12 0006A          BNEQ    2$                                      ;
                     2A    A0           01  8A 0006C          BICB2   #1, 42(NOD)                             ; 0361
                                        50  DD 00070          PUSHL   NOD                                     ; 0362
                   FEF3    CF           01  FB 00072          CALLS   #1, CLUSMSG_ACK_PLEASE                  ;
                                            04 00077 2$:      RET                                             ; 0367

; Routine Size:  120 bytes,    Routine Base:  $CODE$ + 0096
```

```
1 GLOBAL ROUTINE CLUSMSG_CLM_NOTIFY_HANDLER (BUFFER_DESC : $ref_bblock, CLM : $ref_bblock, LEN) : NOVALUE =
1
1 !++
1 ! Functional description:
1 !
1 !       This routine is the handler for all simple messages received from remote nodes.  Simple
1 !       messages are those which merely need to be logged and sent to interested operators.
1 !
1 ! Input:
1 !
1 !       BUFFER_DESC -   pointer to message from remote node, including $SNDOPR header
1 !       CLM -           pointer to CLMRQCB structure
1 !       LEN -           length of LEN
1 !
1 ! Implicit Input:
1 !
1 !       None.
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       Some accounting data will be updated
1 !       to reflect the receipt of the message.
1 !
1 ! Side effects:
1 !
1 !       None.
1 !
1 ! Routine value:
1 !
1 !       None.
1 !--
1
2 BEGIN                                         ! Start of CLUSMSG_CLM_NOTIFY_HANDLER
2
2 LOCAL
2       RQCB            : $ref_bblock,          ! RQCB data structure
2       OCD             : $ref_bblock,          ! OCD data structure
2       OCD_COUNT       : LONG,                 ! Count of OCDs in OCD list
2       OCD_INDEX       : LONG,                 ! Index into OCD_VECTOR
2       OPER_COUNT      : LONG,                 ! Count of operators in operator list
2       STATUS          : LONG;
2
2 !
2 ! Check the version number of the message.  If the message is from any other version,
2 ! simply ignore it.
2 !
2 IF .CLM [CLM_B_DS_VERSION] NEQ CLMRQCB_K_DS_VERSION
2 THEN
2     RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'clm notify mismatch');
2 !
2 ! Allocate an RQCB and convert the message RQCB into the new RQCB
2 !
2 IF NOT CLUSMSG_CONV_CLM_RQCB (.CLM, RQCB)
```

```
;  430        0425  2 THEN
;  431        0426  2     RETURN DUMP_LOG_FILE (.BUFFER_DESC, ascid_INVALIDRQCB);
;  432        0427  2 !
;  433        0428  2 ! Log it, and send it to all interested operators.
;  434        0429  2 ! Every operator in the data base is a candidate for the message.
;  435        0430  2 !
;  436        0431  2 OCD_INDEX = MAX_SCOPE;
;  437        0432  2 WHILE (.OCD_INDEX GEQ MIN_SCOPE) DO
;  438        0433  3     BEGIN
;  439        0434  3     !
;  440        0435  3     ! Scan the OCD list for each class of operator.
;  441        0436  3     !
;  442        0437  3     OCD_COUNT = .OCD_VECTOR [(.OCD_INDEX - 1) * 2 + 1];
;  443        0438  3     OCD = .OCD_VECTOR [(.OCD_INDEX - 1) * 2];
;  444        0439  3     WHILE (.OCD_COUNT GTR 0) DO
;  445        0440  4         BEGIN
;  446        0441  4         !
;  447        0442  4         ! Notify every operator in the OCD's operator list.
;  448        0443  4         ! Also log the message for each OCD.
;  449        0444  4         !
;  450        0445  4         RQCB [RQCB_L_OCD] = .OCD;                     ! Set OCD address
;  451        0446  4         LOG_MESSAGE (.RQCB);                          ! Log the message
;  452        0447  4         NOTIFY_LISTED_OPERATORS (.RQCB);              ! Inform the operators
;  453        0448  4         OCD_COUNT = .OCD_COUNT - 1;                   ! Decrement operator count
;  454        0449  4         OCD = .OCD [OCD_L_FLINK];                     ! Get next OCD address
;  455        0450  3         END;
;  456        0451  3     OCD_INDEX = .OCD_INDEX - 1;
;  457        0452  2     END;
;  458        0453  2 !
;  459        0454  2 ! Free the rqcb
;  460        0455  2 !
;  461        0456  2 DEALLOCATE_RQCB (.RQCB);
;  462        0457  2 RETURN;
;  463        0458  2
;  464        0459  1 END;                                                  ! End of CLUSMSG_CLM_NOTIFY_HANDLER


                                                                          .PSECT  $PLIT$,NOWRT,NOEXE,2

6D  73  69  6D  20  79  66  69  74  6F  6E  20  6D  6C  63  00050 P.AAH:  .ASCII  \clm notify mismatch\<0>              ;
                                            00  68  63  74  61  0005F                                                        ;
                                                  010E0013  00064 P.AAG:  .LONG   17694739                               ;
                                                 00000000'  00068         .ADDRESS P.AAH                                 ;

                                                                          .EXTRN  ASCID_INVALIDRQCB

                                                                          .PSECT  $CODE$,NOWRT,2

                                                      003C  00000         .ENTRY  CLUSMSG_CLM_NOTIFY_HANDLER, Save R2,R3,R4,- ; 0368
                                                                                  R5                                    ;
                                   5E           04  C2  00002             SUBL2   #4, SP                                ;
                                   52      08   AC  D0  00005             MOVL    CLM, R2                               ; 0418
                                   02      02   A2  91  00009             CMPB    2(R2), #2                             ;
                                                06  13  0000D             BEQL    1$                                    ;
                                        0000'   CF  9F  0000F             PUSHAB  P.AAG                                 ; 0420
                                                10  11  00013             BRB     2$                                    ;
```

```
                                                                  B  6
OPC$CLUSMSG                                              16-Sep-1984 01:21:35    VAX-11 Bliss-32 V4.0-742            Page  15
V04-000          clusmsg_ack_please                      14-Sep-1984 12:50:37    [OPCOM.SRC]CLUSMSG.B32;1                  (6)

                                         4004      8F  BB 00015 1$:       PUSHR    #^M<R2,SP>                            ; 0424
                           0000V  CF               02  FB 00019           CALLS    #2, CLUSMSG_CONV_CLM_RQCB             ;
                                  0D               50  E8 0001E           BLBS     R0, 3$                                ;
                                         0000G     CF  9F 00021           PUSHAB   ASCID_INVALIDRQCB                     ; 0426
                                            04     AC  DD 00025 2$:       PUSHL    BUFFER_DESC                           ;
                           0000G  CF               02  FB 00028           CALLS    #2, DUMP_LOG_FILE                     ;
                                                       04 0002D           RET                                            ;
                                  52 000000000G    8F  D0 0002E 3$:       MOVL     #MAX_SCOPE, OCD_INDEX                 ; 0431
                                  53               6E  D0 00035           MOVL     RQCB, R3                              ; 0445
                       000000000G 8F               52  D1 00038 4$:       CMPL     OCD_INDEX, #MIN_SCOPE                 ; 0432
                                                   35  19 0003F           BLSS     7$                                    ;
                     50           52               01  78 00041           ASHL     #1, OCD_INDEX, R0                     ; 0437
                                  55       0000GCF40   D0 00045           MOVL     OCD_VECTOR-4[R0], OCD_COUNT           ;
                     50           52               01  78 0004B           ASHL     #1, OCD_INDEX, R0                     ; 0438
                                  54       0000GCF40   D0 0004F           MOVL     OCD_VECTOR-8[R0], OCD                 ;
                                                   55  D5 00055 5$:       TSTL     OCD_COUNT                             ; 0439
                                                   19  15 00057           BLEQ     6$                                    ;
                             24   A3               54  D0 00059           MOVL     OCD, 36(R3)                           ; 0445
                                                   6E  DD 0005D           PUSHL    RQCB                                  ; 0446
                           0000G  CF               01  FB 0005F           CALLS    #1, LOG_MESSAGE                       ;
                                                   6E  DD 00064           PUSHL    RQCB                                  ; 0447
                           0000G  CF               01  FB 00066           CALLS    #1, NOTIFY_LISTED_OPERATORS           ;
                                                   55  D7 0006B           DECL     OCD_COUNT                             ; 0448
                                  54               64  D0 0006D           MOVL     (OCD), OCD                            ; 0449
                                                   E3  11 00070           BRB      5$                                    ; 0439
                                                   52  D7 00072 6$:       DECL     OCD_INDEX                             ; 0451
                                                   C2  11 00074           BRB      4$                                    ; 0432
                                                   6E  DD 00076 7$:       PUSHL    RQCB                                  ; 0456
                           0000G  CF               01  FB 00078           CALLS    #1, DEALLOCATE_RQCB                   ;
                                                       04 0007D           RET                                            ; 0459

; Routine Size:  126 bytes,    Routine Base:  $CODE$ + 010E
```

```
1 GLOBAL ROUTINE CLUSMSG_CONV_CLM_RQCB (CLM : $ref_bblock, RET_RQCB) =    %SBTTL 'CLUSMSG_CONV_CLM_RQCB (CLM,
1
1 !++
1 ! Functional description:
1 !
1 !       Convert a CLMRQCB to a local RQCB
1 !
1 ! Input:
1 !
1 !       CLM      - Pointer to CLMRQCB structure
1 !       RET_RQCB - Address of longword to receive address of allocated RQCB
1 !
1 ! Implicit Input:
1 !
1 !       None.
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       None.
1 !
1 ! Side effects:
1 !
1 !       Data structure will be allocated
1 !
1 ! Routine value:
1 !
1 !       Success or failure
1 !--
1
2 BEGIN                                                   ! Start of CLUSMSG_CONV_CLM_RQCB
2
2 LOCAL
2       LEN             : LONG,
2       EOB             : LONG,
2       PTR             : $ref_bblock,
2       RQCB            : $ref_bblock,
2       RQCBUF          : $ref_bblock,
2       STATUS          : LONG;
2
2 !
2 ! Set the return RQCB to null
2 !
2 .RET_RQCB = 0;
2 !
2 ! Make sure that it is an RQCB in the message
2 !
2 RQCBUF = CLM [CLMRQCB_T_RQCB_OVERLAY];
2 IF .RQCBUF [RQCB_W_SIZE] NEQ RQCB_K_SIZE
2   OR
2    .RQCBUF [RQCB_B_TYPE] NEQ RQCB_K_TYPE
2 THEN
2     RETURN FALSE;
2 !
```

```
2 ! Next thing, allocate an RQCB and copy the most of the CLM RQCB to the new RQCB,
2 ! taking care not to overwrite the RQCB header data
2 !
2 ALLOCATE_DS (RQCB_K_TYPE, RQCB);
2 CH$MOVE (RQCB_K_OVERLAY_SIZE, RQCBUF [RQCB_T_OVERLAY], RQCB [RQCB_T_OVERLAY]);
2 !
2 ! Take all of the character strings appended to the CLMRQCB and hang them from the RQCB
2 !
2 PTR = CLM [CLMRQCB_T_TEXT];                           ! Pointer to next data in text area
2 EOB = .CLM + .CLM [CLM_W_LENGTH];                     ! Pointer to last byte +1 of text area
2 !
2 ! If the original had an MCB, make a new MCB
2 !
2 IF (LEN = .RQCBUF [RQCB_L_MCB]) NEQ 0
2 THEN
3     BEGIN
3     LOCAL
3         FAO_DESC : VECTOR [2, LONG],
3         FAO_BUFF : VECTOR [OPC$K_MAXMESSAGE, BYTE],
3         MCB : $ref_bblock,
3         NOD : $ref_bblock,
3         NEXT;
3     IF (NEXT = .LEN + .PTR) GTRU .EOB
3     THEN
4         BEGIN
4         DEALLOCATE_RQCB (.RQCB);
4         RETURN FALSE;
3         END;
3     ALLOCATE_DS (MCB_K_TYPE, MCB);
3     RQCB [RQCB_L_MCB] = .MCB;
3     MCB [MCB_L_RQCB] = .RQCB;
3     MCB [MCB_L_MSGID] = .CLM [CLMRQCB_L_MCB_MSGID];      ! Restore message id
3     MCB [MCB_L_STATUS] = .CLM [CLMRQCB_L_MCB_STATUS];    !  and status
3     !
3     ! If the message is a standard header message, then readjust it so that we store the local
3     ! time at the front and record the remote time later in the message.
3     ! We check to make sure it hasn't been adjusted already, as can happen if the request was
3     ! being passed around.
3     !
3     IF CH$EQL (20, UPLIT BYTE ('%%%%%%%%%%%  OPCOM  '), 20, .PTR+1)
3     THEN
4         BEGIN
4         LOCAL
4             PAR, CR;
4         PAR = CH$FIND_CH (.LEN, .PTR, %C'(');            ! Find first open paren
4         CR  = CH$FIND_CH (.LEN, .PTR, 13);               ! Find first carriage return (gotta have one!)
4         IF .PAR EQL 0                                    ! If no paren
4            OR
4             .PAR GTR .CR                                 !  or if paren after first <CR>
4         THEN
5             BEGIN
5             FAO_DESC [0] = OPC$K_MAXMESSAGE;
5             FAO_DESC [1] = FAO_BUFF;
5             NOD = CLUSUTIL_FIND_NOD_BY_CSID (.RQCB [RQCB_L_CSID]);
5             IF .NOD EQL 0
5             THEN
6                 BEGIN
```

```
:     6                     WRITE_LOG_FILE (SHARE_FAO_BUFFER (%ASCID 'Unable to find NOD for CSID !XL', .RQCB [RQCB_L_CS
:     6                     DEALLOCATE_RQCB (.RQCB);
:     6                     RETURN FALSE;
:     5                     END;
:   P 5                 $FAO (%ASCID '!AD!%D!AD    (from node !6AS at !AD)!AD', FAO_DESC, FAO_DESC,
:     5                                             21, .PTR, 0, 13, .PTR+44, NOD [NOD_Q_NAME_DESC], 23, .PTR+21, .LEN-57, .
:     5                 LEN = .FAO_DESC [0];
:     5                 PTR = FAO_BUFF;
:     4                 END;
:     3             END;
:     3         MCB [MCB_L_TEXTLEN] = .LEN;
:     4         IF NOT (STATUS = OPC$GET_VM (MCB [MCB_L_TEXTLEN], MCB [MCB_L_TEXTPTR]))
:     3         THEN
:     3             $signal_stop (.STATUS);
:     3         CH$MOVE (.LEN, .PTR, .MCB [MCB_L_TEXTPTR]);             ! Copy the message
:     3         PTR = .NEXT;                                            ! Update the output pointer
:     2         END;
:     2     !
:     2     ! If the original had an operator name, make a new operator name
:     2     !
:     2     IF (LEN = .RQCBUF [RQCB_L_OPER_LEN]) NEQ 0
:     2     THEN
:     3         BEGIN
:     3         LOCAL
:     3             NEXT;
:     3         IF (NEXT = .LEN + .PTR) GTRU .EOB
:     3         THEN
:     4             BEGIN
:     4             DEALLOCATE_RQCB (.RQCB);
:     4             RETURN FALSE;
:     3             END;
:     4         IF NOT (STATUS = OPC$GET_VM (RQCB [RQCB_L_OPER_LEN], RQCB [RQCB_L_OPER_PTR]))
:     3         THEN
:     3             $signal_stop (.STATUS);
:     3         CH$MOVE (.LEN, .PTR, .RQCB [RQCB_L_OPER_PTR]);          ! Copy the message
:     3         PTR = .NEXT;                                            ! Update the output pointer
:     2         END;
:     2     !
:     2     ! If the original had text field, make a new one
:     2     !
:     2     IF (LEN = .RQCBUF [RQCB_L_TEXT_LEN]) NEQ 0
:     2     THEN
:     3         BEGIN
:     3         LOCAL
:     3             NEXT;
:     3         IF (NEXT = .LEN + .PTR) GTRU .EOB
:     3         THEN
:     4             BEGIN
:     4             DEALLOCATE_RQCB (.RQCB);
:     4             RETURN FALSE;
:     3             END;
:     4         IF NOT (STATUS = OPC$GET_VM (RQCB [RQCB_L_TEXT_LEN], RQCB [RQCB_L_TEXT_PTR]))
:     3         THEN
:     3             $signal_stop (.STATUS);
:     3         CH$MOVE (.LEN, .PTR, .RQCB [RQCB_L_TEXT_PTR]);          ! Copy the message
:     3         PTR = .NEXT;                                            ! Update the output pointer
:     2         END;
```

```
;  637            0631  2 !
;  638            0632  2 ! Set the return RQCB to the one we allocated
;  639            0633  2 !
;  640            0634  2 .RET_RQCB = .RQCB;
;  641            0635  2 !
;  642            0636  2 RETURN TRUE;
;  643            0637  1 END;                                                    ! End of CLUSMSG_CONV_CLM_RQCB


                                                                                  .PSECT  $PLIT$,NOWRT,NOEXE,2

50  4F  20  20  25  25  25  25  25  25  25  25  25  25  25  0006C P.AAI:  .ASCII  \%%%%%%%%%%%  OPCOM  \                    :
                                            20  20  4D  4F  43  0007B                                                               :
20  64  6E  69  66  20  6F  74  20  65  6C  62  61  6E  55  00080 P.AAK:  .ASCII  \Unable to find NOD for CSID !XL\<0>       :
58  21  20  44  49  53  43  20  72  6F  66  20  44  4F  4E  0008F                                                                   :
                                                    00  4C  0009E                                                                   :
                                              010E001F  000A0 P.AAJ:  .LONG   17694751                                              :
                                             00000000'  000A4         .ADDRESS P.AAK                                                :
66  28  20  20  20  20  44  41  21  44  25  21  44  41  21  000A8 P.AAM:  .ASCII  \!AD!%D!AD    (from node !6AS at !AD)!AD-  :
61  20  53  41  36  21  20  65  64  6F  6E  20  6D  6F  72  000B7         \<0>                                                  :
                    00  44  41  21  29  44  41  21  20  74  000C6                                                                   :
                                              010E0027  000D0 P.AAL:  .LONG   17694759                                              :
                                             00000000'  000D4         .ADDRESS P.AAM                                                :

                                                                  .EXTRN  SYS$FAO, OPC$GET_VM
                                                                  .EXTRN  LIB$STOP

                                                                  .PSECT  $CODE$,NOWRT,2

                                                  0FFC 00000      .ENTRY  CLUSMSG_CONV_CLM_RQCB, Save R2,R3,R4,R5,R6,-; 0460
                                                                          R7,R8,R9,R10,R11                                     :
                                5E      F7EC   CE  9E 00002       MOVAB   -2068(SP), SP                                        :
                                          08   BC  D4 00007       CLRL    @RET_RQCB                                            ; 0506
                                5B        04   AC  D0 0000A       MOVL    CLM, R11                                             ; 0510
                                57        0C   AB  9E 0000E       MOVAB   12(R11), RQCBUF                                      :
                         0094   8F        08   A7  B1 00012       CMPW    8(RQCBUF), #148                                      ; 0511
                                               0A  12 00018       BNEQ    1$                                                   :
00000000G  8F      0A   A7      08             00  ED 0001A       CMPZV   #0, #8, 10(RQCBUF), #RQCB_K_TYPE                     ; 0513
                                               03  13 00024 1$:   BEQL    2$                                                   :
                                             0172  31 00026       BRW     17$                                                  :
                                          04   AE  9F 00029 2$:   PUSHAB  RQCB                                                 ; 0520
                                   00000000G   8F  DD 0002C       PUSHL   #RQCB_K_TYPE                                         :
                         0000G  CF             02  FB 00032       CALLS   #2, ALLOCATE_DS                                      :
                                58        04   AE  D0 00037       MOVL    RQCB, R8                                             ; 0521
           10   A8       10     A7      0084   8F  28 0003B       MOVC3   #132, 16(RQCBUF), 16(R8)                             :
                                56      00A8   CB  9E 00043       MOVAB   168(R11), PTR                                        ; 0525
                                50        04   AB  3C 00048       MOVZWL  4(R11), R0                                           ; 0526
                6E              5B             50  C1 0004C       ADDL3   R0, R11, EOB                                         :
                                5A        6C   A7  D0 00050       MOVL    108(RQCBUF), LEN                                     ; 0530
                                               03  12 00054       BNEQ    3$                                                   :
                                             00D1  31 00056       BRW     10$                                                  :
                59              5A             56  C1 00059 3$:   ADDL3   PTR, LEN, NEXT                                       ; 0539
                                6E             59  D1 0005D       CMPL    NEXT, EOB                                            :
                                               76  1A 00060       BGTRU   7$                                                   :
                                          08   AE  9F 00062       PUSHAB  MCB                                                  ; 0545
                                   00000000G   8F  DD 00065       PUSHL   #MCB_K_TYPE                                          :
```

```
                                                                   G  6
OPC$CLUSMSG                                                    16-Sep-1984 01:21:35    VAX-11 Bliss-32 V4.0-742              Page  20
V04-000           CLUSMSG_CONV_CLM_RQCB (CLM, RET_RQCB)          14-Sep-1984 12:50:37    [OPCOM.SRC]CLUSMSG.B32;1                  (7)

                    0000G  CF           02  FB 0006B         CALLS   #2, ALLOCATE_DS                          ;
                           54     08    AE  D0 00070         MOVL    MCB, R4                                  ; 0546
                       6C  A8           54  D0 00074         MOVL    R4, 108(R8)                              ;
                       24  A4           58  D0 00078         MOVL    R8, 36(R4)                               ; 0547
                       2C  A4   00A0    CB  D0 0007C         MOVL    160(R11), 44(R4)                         ; 0548
                       28  A4   00A4    CB  D0 00082         MOVL    164(R11), 40(R4)                         ; 0549
   01    A6     0000'  CF           14  29 00088         CMPC3   #20, P.AAI, 1(PTR)                       ; 0556
                                        7C  12 0008F         BNEQ    9$                                       ;
         66                5A           28  3A 00091         LOCC    #40, LEN, (PTR)                          ; 0561
                                        02  12 00095         BNEQ    4$                                       ;
                                        51  D4 00097         CLRL    R1                                       ;
                           52           51  D0 00099 4$:     MOVL    R1, PAR                                  ;
         66                5A           0D  3A 0009C         LOCC    #13, LEN, (PTR)                          ; 0562
                                        02  12 000A0         BNEQ    5$                                       ;
                                        51  D4 000A2         CLRL    R1                                       ;
                                        52  D5 000A4 5$:     TSTL    PAR                                      ; 0563
                                        05  13 000A6         BEQL    6$                                       ;
                           51           52  D1 000A8         CMPL    PAR, CR                                  ; 0565
                                        60  15 000AB         BLEQ    9$                                       ;
                       F8  AD   0800    8F  3C 000AD 6$:     MOVZWL  #2048, FAO_DESC                          ; 0568
                       FC  AD     0C    AE  9E 000B3         MOVAB   FAO_BUFF, FAO_DESC+4                     ; 0569
                                  14    A8  DD 000B8         PUSHL   20(R8)                                   ; 0570
                    0000G  CF           01  FB 000BB         CALLS   #1, CLUSUTIL_FIND_NOD_BY_CSID            ;
                           52           50  D0 000C0         MOVL    R0, NOD                                  ;
                                        16  12 000C3         BNEQ    8$                                       ; 0571
                                  14    A8  DD 000C5         PUSHL   20(R8)                                   ; 0574
                                0000'   CF  9F 000C8         PUSHAB  P.AAJ                                    ;
                    0000G  CF           02  FB 000CC         CALLS   #2, SHARE_FAO_BUFFER                     ;
                                        50  DD 000D1         PUSHL   R0                                       ;
                    0000G  CF           01  FB 000D3         CALLS   #1, WRITE_LOG_FILE                       ;
                                      0089  31 000D8 7$:     BRW     12$                                      ; 0575
                                  39    A6  9F 000DB 8$:     PUSHAB  57(PTR)                                  ; 0579
                                  C7    AA  9F 000DE         PUSHAB  -57(LEN)                                 ;
                                  15    A6  9F 000E1         PUSHAB  21(PTR)                                  ;
                                        17  DD 000E4         PUSHL   #23                                      ;
                                  30    A2  9F 000E6         PUSHAB  48(NOD)                                  ;
                                  2C    A6  9F 000E9         PUSHAB  44(PTR)                                  ;
                                        0D  DD 000EC         PUSHL   #13                                      ;
                                        7E  D4 000EE         CLRL    -(SP)                                    ;
                                        56  DD 000F0         PUSHL   PTR                                      ;
                                        15  DD 000F2         PUSHL   #21                                      ;
                                  F8    AD  9F 000F4         PUSHAB  FAO_DESC                                 ;
                                  F8    AD  9F 000F7         PUSHAB  FAO_DESC                                 ;
                                0000'   CF  9F 000FA         PUSHAB  P.AAL                                    ;
                00000000G  00           0D  FB 000FE         CALLS   #13, SYS$FAO                             ;
                           5A     F8    AD  D0 00105         MOVL    FAO_DESC, LEN                            ; 0580
                           56     0C    AE  9E 00109         MOVAB   FAO_BUFF, PTR                            ; 0581
                       30  A4           5A  D0 0010D 9$:     MOVL    LEN, 48(R4)                              ; 0584
                                  34    A4  9F 00111         PUSHAB  52(R4)                                   ; 0585
                                  30    A4  9F 00114         PUSHAB  48(R4)                                   ;
                    0000G  CF           02  FB 00117         CALLS   #2, OPC$GET_VM                           ;
                           5B           50  D0 0011C         MOVL    R0, STATUS                               ;
                           5E           5B  E9 0011F         BLBC    STATUS, 14$                              ;
   34    B4                66           5A  28 00122         MOVC3   LEN, (PTR), @52(R4)                      ; 0588
                           56           59  D0 00127         MOVL    NEXT, PTR                                ; 0589
                           5A     7C    A7  D0 0012A 10$:    MOVL    124(RQCBUF), LEN                         ; 0594
                                        24  13 0012E         BEQL    11$                                      ;
```

```
                 59          5A            56  C1 00130        ADDL3   PTR, LEN, NEXT                                    ; 0599
                             6E            59  D1 00134        CMPL    NEXT, EOB                                         ;
                                           2B  1A 00137        BGTRU   12$                                               ;
                                   0080    C8  9F 00139        PUSHAB  128(R8)                                           ; 0605
                                     7C    A8  9F 0013D        PUSHAB  124(R8)                                           ;
                      0000G  CF            02  FB 00140        CALLS   #2, OPC$GET_VM                                    ;
                             5B            50  D0 00145        MOVL    R0, STATUS                                        ;
                             35            5B  E9 00148        BLBC    STATUS, 14$                                       ;
           0080  D8          66            5A  28 0014B        MOVC3   LEN, (PTR), @128(R8)                              ; 0608
                             56            59  D0 00151        MOVL    NEXT, PTR                                         ; 0609
                             5A    0084    C7  D0 00154 11$:   MOVL    132(RQCBUF), LEN                                  ; 0614
                                           38  13 00159        BEQL    16$                                               ;
                 57          5A            56  C1 0015B        ADDL3   PTR, LEN, NEXT                                    ; 0619
                             6E            57  D1 0015F        CMPL    NEXT, EOB                                         ;
                                           09  1B 00162        BLEQU   13$                                               ;
                                           58  DD 00164 12$:   PUSHL   R8                                                ; 0622
                      0000G  CF            01  FB 00166        CALLS   #1, DEALLOCATE_RQCB                               ;
                                           2E  11 0016B        BRB     17$                                               ; 0623
                                   0088    C8  9F 0016D 13$:   PUSHAB  136(R8)                                           ; 0625
                                   0084    C8  9F 00171        PUSHAB  132(R8)                                           ;
                      0000G  CF            02  FB 00175        CALLS   #2, OPC$GET_VM                                    ;
                             5B            50  D0 0017A        MOVL    R0, STATUS                                        ;
                             0A            5B  E8 0017D        BLBS    STATUS, 15$                                       ;
                                           5B  DD 00180 14$:   PUSHL   STATUS                                            ; 0627
                  00000000G  00            01  FB 00182        CALLS   #1, LIB$STOP                                      ;
                                               04 00189        RET                                                       ;
           0088  D8          66            5A  28 0018A 15$:   MOVC3   LEN, (PTR), @136(R8)                              ; 0628
                             56            57  D0 00190        MOVL    NEXT, PTR                                         ; 0629
                         08  BC            58  D0 00193 16$:   MOVL    R8, @RET_RQCB                                     ; 0634
                             50            01  D0 00197        MOVL    #1, R0                                            ; 0636
                                               04 0019A        RET                                                       ;
                                           50  D4 0019B 17$:   CLRL    R0                                                ; 0637
                                               04 0019D        RET                                                       ;

; Routine Size:  414 bytes,    Routine Base:  $CODE$ + 018C
```

```
1 GLOBAL ROUTINE CLUSMSG_HANDLER (buffer_desc : $ref_bblock) : NOVALUE =
1
1 !++
1 ! Functional description:
1 !
1 !       This routine processes all messages alleged to have come from remote nodes (plus local broadcasts).
1 !
1 ! Input:
1 !
1 !       BUFFER_DESC : The address of a quadword buffer descriptor that
1 !                     describes the buffer containing the message.
1 !
1 ! Implicit Input:
1 !
1 !       None.
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       None.
1 !
1 ! Side effects:
1 !
1 !       None.
1 !
1 ! Routine value:
1 !
1 !       None.
1 !--
1
2 BEGIN                                                 ! Start of CLUSMSG_HANDLER
2
2 LOCAL
2       len,                                            ! Length of message without the $SNDOPR header
2       msg             : $ref_bblock,                  ! Pointer to reply command message
2       status;
2 !
2 ! Get a pointer to the regular part of the message, and compute the length.
2 !
2 msg = .buffer_desc [dsc$a_pointer] + opc$k_comhdrsiz;   ! Init the message pointer
2 len = .buffer_desc [dsc$w_length] - opc$k_comhdrsiz;    ! Init the message pointer
2 !
2 ! Check the version number of the message.  If the message is from any other version,
2 ! simply ignore it.
2 !
2 IF .msg [clm_b_sw_version] NEQ opc$k_sw_version
2 THEN
2     RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'clm software mismatch');
2 !
2 ! Check the actual length of the message vs. the length stored in the
2 ! message.  If any difference, ignore the message
2 !
2 IF .msg [clm_w_length] NEQ .len
2 THEN
```

```
2          RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'clm length mismatch');
2    !
2    ! Perform some privilege and sanity checks on CLM messages
2    !
2    IF .msg [clm_b_clm_code] NEQ clm__rpybrd_local   ! Local replies are checked in CLUSREPLY module
2    THEN
3        BEGIN
3        BIND
3            hdr = .buffer_desc [dsc$a_pointer] : $bblock;    ! Start of $sndopr header
3        !
3        ! If not in a cluster, nothing to do but shout
3        !
3        IF NOT .GLOBAL_STATUS [GBLSTS_K_IN_VAXcluster]
3        THEN
3            RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'clm message in non-cluster');
3        !
3        ! Try to make sure that this is coming from the CLUSTER_SERVER process.  Since process name is
3        ! not (yet) part of the $SNDOPR header, we will check that the sender has both the UIC [1,4] and
3        ! has all privileges enabled.  This isn't completely solid, but someone with SETPRV would probably
3        ! be able to circumvent any check we could make.
3        !
3        IF  .hdr [4,0,32,0] NEQ -1                   ! First longword of priv mask in $sndopr header
3          OR
3            .hdr [8,0,32,0] NEQ -1                   ! Second longword of privs
3          OR
3            .hdr [12,0,32,0] NEQ %X'00010004'        ! UIC of [1,4]
3        THEN
3            RETURN DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'clm privilege violation');
3        !
3        ! Find the sending node in the database.  If we don't see it, then reconfigure.  If we
3        ! still do not see it after a reconfigure, then discard the message.  It is most likely
3        ! from a node which has crashed and rebooted.
3        !
3        IF CLUSUTIL_FIND_NOD_BY_CSID (.msg [clm_l_csid]) EQL 0
3        THEN
4            BEGIN
4            CLUSUTIL_CONFIGURE ();                                    ! Might find the node
4            IF CLUSUTIL_FIND_NOD_BY_CSID (.msg [clm_l_csid]) EQL 0
4            THEN
4                RETURN;
3            END;
2        END;
2    !
2    ! Dispatch the request to the proper handler.
2    !
2    CASE .msg [clm_b_clm_code]
2        FROM  0  TO  clm__request_end_mark-1  OF
2        SET
2        !
2        [clm__acknowledgement] :    CLUSMSG_CLM_ACK_HANDLER          (.buffer_desc, .msg, .len);
2        [clm__acknowledge_please] : CLUSMSG_CLM_ACK_PLEASE_HANDLER   (.buffer_desc, .msg, .len);
2        [clm__cancel] :             CANCEL_CLM_HANDLER               (.buffer_desc, .msg, .len);
2        [clm__check_operator] :     OPRENABLE_CLM_HANDLER            (.buffer_desc, .msg, .len);
2        [clm__check_request] :      REQUEST_CLM_CHECK_HANDLER        (.buffer_desc, .msg, .len);
2        [clm__clumbx] :             CLUSMSG_CLM_NOTIFY_HANDLER       (.buffer_desc, .msg, .len);
2        [clm__cluster] :            CLUSMSG_CLM_NOTIFY_HANDLER       (.buffer_desc, .msg, .len);
2        [clm__device] :             CLUSMSG_CLM_NOTIFY_HANDLER       (.buffer_desc, .msg, .len);
```

```
;  759       0752  2        [clm__imp_disable] :          OPERUTIL_CLM_IMP_DISABLE          (.buffer_desc, .msg, .len);
;  760       0753  2        [clm__oprenable] :            OPRENABLE_CLM_HANDLER             (.buffer_desc, .msg, .len);
;  761       0754  2        [clm__reply] :                REPLY_CLM_HANDLER                 (.buffer_desc, .msg, .len);
;  762       0755  2        [clm__reply_complete] :       CANCEL_CLM_HANDLER                (.buffer_desc, .msg, .len);
;  763       0756  2        [clm__request] :              REQUEST_CLM_HANDLER               (.buffer_desc, .msg, .len);
;  764       0757  2        [clm__rpybrd] :               CLUSREPLY_RPYBRD_HANDLER          (.buffer_desc, .msg, .len);
;  765       0758  2        [clm__rpybrd_local] :         CLUSREPLY_RPYBRD_LOCAL_HANDLER    (.buffer_desc, .msg, .len);
;  766       0759  2        [clm__rpynot] :               CLUSREPLY_RPYNOT_HANDLER          (.buffer_desc, .msg, .len);
;  767       0760  2        [clm__security] :             CLUSMSG_CLM_NOTIFY_HANDLER        (.buffer_desc, .msg, .len);
;  768       0761  2        [clm__shutdown] :             SHUTDOWN_CLM_HANDLER              (.buffer_desc, .msg, .len);
;  769       0762  2        !
;  770       0763  2        ! Let the unknown message handler figure out what to do with it.
;  771       0764  2        !
;  772       0765  2        [INRANGE,OUTRANGE] :          DUMP_LOG_FILE (.BUFFER_DESC, %ASCID 'unknown CLM_CODE in message');
;  773       0766  2        TES;
;  774       0767  2
;  775       0768  2   RETURN;
;  776       0769  1   END;                                                 ! End of CLUSMSG_HANDLER



                                                                             .PSECT  $PLIT$,NOWRT,NOEXE,2

69  6D  20  65  72  61  77  74  66  6F  73  20  6D  6C  63  000D8 P.AAO:  .ASCII  \clm software mismatch\<0><0><0>             :
                        00  00  00  68  63  74  61  6D  73  000E7                                                               :
                                                 010E0015   000F0 P.AAN:  .LONG   17694741                                      :
                                                 00000000'  000F4         .ADDRESS P.AAO                                        :
6D  73  69  6D  20  68  74  67  6E  65  6C  20  6D  6C  63  000F8 P.AAQ:  .ASCII  \clm length mismatch\<0>                     :
                                    00  68  63  74  61  00107                                                               :
                                                 010E0013   0010C P.AAP:  .LONG   17694739                                      :
                                                 00000000'  00110         .ADDRESS P.AAQ                                        :
20  6E  69  20  65  67  61  73  73  65  6D  20  6D  6C  63  00114 P.AAS:  .ASCII  \clm message in non-cluster\<0><0>           :
        00  00  72  65  74  73  75  6C  63  2D  6E  6F  6E  00123                                                               :
                                                 010E001A   00130 P.AAR:  .LONG   17694746                                      :
                                                 00000000'  00134         .ADDRESS P.AAS                                        :
76  20  65  67  65  6C  69  76  69  72  70  20  6D  6C  63  00138 P.AAU:  .ASCII  \clm privilege violation\<0>                 :
                        00  6E  6F  69  74  61  6C  6F  69  00147                                                               :
                                                 010E0017   00150 P.AAT:  .LONG   17694743                                      :
                                                 00000000'  00154         .ADDRESS P.AAU                                        :
44  4F  43  5F  4D  4C  43  20  6E  77  6F  6E  6B  6E  75  00158 P.AAW:  .ASCII  \unknown CLM_CODE in message\<0>             :
        00  65  67  61  73  73  65  6D  20  6E  69  20  45  00167                                                               :
                                                 010E001B   00174 P.AAV:  .LONG   17694747                                      :
                                                 00000000'  00178         .ADDRESS P.AAW                                        :



                                                                          .PSECT  $CODE$,NOWRT,2

                                                      003C 00000          .ENTRY  CLUSMSG_HANDLER, Save R2,R3,R4,R5             : 0638
                         54          04      AC   D0 00002          MOVL    BUFFER_DESC, R4                               : 0680
          52        04   A4                  26   C1 00006          ADDL3   #38, 4(R4), MSG                               :
                         55                  64   3C 0000B          MOVZWL  (R4), LEN                                     : 0681
                         55                  26   C2 0000E          SUBL2   #38, LEN                                      :
                         09          03      A2   91 00011          CMPB    3(MSG), #9                                    : 0686
                                             06   13 00015          BEQL    1$                                            :
                                   0000'     CF   9F 00017          PUSHAB  P.AAN                                         : 0688
                                             45   11 0001B          BRB     5$                                            :
```

```
         55       04   A2            10              00  ED 0001D 1$:    CMPZV   #0, #16, 4(MSG), LEN                  ; 0693
                                                     06  13 00023        BEQL    2$                                    ;
                                           0000'     CF  9F 00025        PUSHAB  P.AAP                                 ; 0695
                                                     37  11 00029        BRB     5$                                    ;
                                     10        01    A2  91 0002B 2$:    CMPB    1(MSG), #16                           ; 0699
                                                     51  13 0002F        BEQL    7$                                    ;
                                     53        04    A4  D0 00031        MOVL    4(R4), R3                             ; 0703
                                     06     0000G    CF  E8 00035        BLBS    GLOBAL_STATUS+1, 3$                   ; 0707
                                            0000'    CF  9F 0003A        PUSHAB  P.AAR                                 ; 0709
                                                     73  11 0003E        BRB     10$                                   ;
                       FFFFFFFF      8F        04    A3  D1 00040 3$:    CMPL    4(R3), #-1                            ; 0716
                                                     14  12 00048        BNEQ    4$                                    ;
                       FFFFFFFF      8F        08    A3  D1 0004A        CMPL    8(R3), #-1                            ; 0718
                                                     0A  12 00052        BNEQ    4$                                    ;
                       00010004      8F        0C    A3  D1 00054        CMPL    12(R3), #65540                        ; 0720
                                                     06  13 0005C        BEQL    6$                                    ;
                                            0000'    CF  9F 0005E 4$:    PUSHAB  P.AAT                                 ; 0722
                                                     4F  11 00062 5$:    BRB     10$                                   ;
                                               08    A2  DD 00064 6$:    PUSHL   8(MSG)                                ; 0728
                            0000G    CF              01  FB 00067        CALLS   #1, CLUSUTIL_FIND_NOD_BY_CSID         ;
                                                     50  D5 0006C        TSTL    R0                                    ;
                                                     12  12 0006E        BNEQ    7$                                    ;
                            0000G    CF              00  FB 00070        CALLS   #0, CLUSUTIL_CONFIGURE                ; 0731
                                               08    A2  DD 00075        PUSHL   8(MSG)                                ; 0732
                            0000G    CF              01  FB 00078        CALLS   #1, CLUSUTIL_FIND_NOD_BY_CSID         ;
                                                     50  D5 0007D        TSTL    R0                                    ;
                                                     01  12 0007F        BNEQ    7$                                    ;
                                                         04 00081        RET                                           ;
                      13             00        01    A2  8F 00082 7$:    CASEB   1(MSG), #0, #19                       ; 0740
   0070         003E           0034              0028       00087 8$:    .WORD   9$-8$,-                               ;
   00A2         00A2           0048              005C       0008F                11$-8$,-                              ;
   005C         0052           0028              00A2       00097                12$-8$,-                              ;
   0084         007A           0070              0066       0009F                17$-8$,-                              ;
   00AC         00A2           0098              008E       000A7                15$-8$,-                              ;
                                                                                 13$-8$,-                              ;
                                                                                 22$-8$,-                              ;
                                                                                 22$-8$,-                              ;
                                                                                 22$-8$,-                              ;
                                                                                 9$-8$,-                               ;
                                                                                 14$-8$,-                              ;
                                                                                 15$-8$,-                              ;
                                                                                 16$-8$,-                              ;
                                                                                 17$-8$,-                              ;
                                                                                 18$-8$,-                              ;
                                                                                 19$-8$,-                              ;
                                                                                 20$-8$,-                              ;
                                                                                 21$-8$,-                              ;
                                                                                 22$-8$,-                              ;
                                                                                 23$-8$                                ;
                                            0000'    CF  9F 000AF 9$:    PUSHAB  P.AAV                                 ; 0765
                                                     54  DD 000B3 10$:   PUSHL   R4                                    ;
                            0000G    CF              02  FB 000B5        CALLS   #2, DUMP_LOG_FILE                     ;
                                                         04 000BA        RET                                           ;
                                                     24  BB 000BB 11$:   PUSHR   #^M<R2,R5>                            ; 0744
                                                     54  DD 000BD        PUSHL   R4                                    ;
                            FC74     CF              03  FB 000BF        CALLS   #3, CLUSMSG_CLM_ACK_HANDLER           ;
                                                         04 000C4        RET                                           ;
                                     24  BB 000C5 12$:     PUSHR    #^M<R2,R5>                                          ; 0745
                                     54  DD 000C7          PUSHL    R4
                  FC9E    CF         03  FB 000C9          CALLS    #3, CLUSMSG_CLM_ACK_PLEASE_HANDLER
                                     04  000CE             RET
                                     24  BB 000CF 13$:     PUSHR    #^M<R2,R5>                                          ; 0748
                                     54  DD 000D1          PUSHL    R4
                  0000G   CF         03  FB 000D3          CALLS    #3, REQUEST_CLM_CHECK_HANDLER
                                     04  000D8             RET
                                     24  BB 000D9 14$:     PUSHR    #^M<R2,R5>                                          ; 0752
                                     54  DD 000DB          PUSHL    R4
                  0000G   CF         03  FB 000DD          CALLS    #3, OPERUTIL_CLM_IMP_DISABLE
                                     04  000E2             RET
                                     24  BB 000E3 15$:     PUSHR    #^M<R2,R5>                                          ; 0753
                                     54  DD 000E5          PUSHL    R4
                  0000G   CF         03  FB 000E7          CALLS    #3, OPRENABLE_CLM_HANDLER
                                     04  000EC             RET
                                     24  BB 000ED 16$:     PUSHR    #^M<R2,R5>                                          ; 0754
                                     54  DD 000EF          PUSHL    R4
                  0000G   CF         03  FB 000F1          CALLS    #3, REPLY_CLM_HANDLER
                                     04  000F6             RET
                                     24  BB 000F7 17$:     PUSHR    #^M<R2,R5>                                          ; 0755
                                     54  DD 000F9          PUSHL    R4
                  0000G   CF         03  FB 000FB          CALLS    #3, CANCEL_CLM_HANDLER
                                     04  00100             RET
                                     24  BB 00101 18$:     PUSHR    #^M<R2,R5>                                          ; 0756
                                     54  DD 00103          PUSHL    R4
                  0000G   CF         03  FB 00105          CALLS    #3, REQUEST_CLM_HANDLER
                                     04  0010A             RET
                                     24  BB 0010B 19$:     PUSHR    #^M<R2,R5>                                          ; 0757
                                     54  DD 0010D          PUSHL    R4
                  0000G   CF         03  FB 0010F          CALLS    #3, CLUSREPLY_RPYBRD_HANDLER
                                     04  00114             RET
                                     24  BB 00115 20$:     PUSHR    #^M<R2,R5>                                          ; 0758
                                     54  DD 00117          PUSHL    R4
                  0000G   CF         03  FB 00119          CALLS    #3, CLUSREPLY_RPYBRD_LOCAL_HANDLER
                                     04  0011E             RET
                                     24  BB 0011F 21$:     PUSHR    #^M<R2,R5>                                          ; 0759
                                     54  DD 00121          PUSHL    R4
                  0000G   CF         03  FB 00123          CALLS    #3, CLUSREPLY_RPYNOT_HANDLER
                                     04  00128             RET
                                     24  BB 00129 22$:     PUSHR    #^M<R2,R5>                                          ; 0760
                                     54  DD 0012B          PUSHL    R4
                  FCB2    CF         03  FB 0012D          CALLS    #3, CLUSMSG_CLM_NOTIFY_HANDLER
                                     04  00132             RET
                                     24  BB 00133 23$:     PUSHR    #^M<R2,R5>                                          ; 0761
                                     54  DD 00135          PUSHL    R4
                  0000G   CF         03  FB 00137          CALLS    #3, SHUTDOWN_CLM_HANDLER
                                     04  0013C             RET                                                          ; 0769

; Routine Size:  317 bytes,    Routine Base:  $CODE$ + 032A
```

```
1 GLOBAL ROUTINE CLUSMSG_RQCB_SEND (CSID, CLM_CODE, RQCB : $ref_bblock) = %SBTTL 'CLUSMSG_RQCB_SEND (CSID, CLM
1
1 !++
1 ! Functional description:
1 !
1 !       Put an RQCB into a self-relative format, and send it to remote node(s)
1 !
1 ! Input:
1 !
1 !       CSID     - Id of target node, -1 for broadcast to all nodes except local
1 !       CLM_CODE - Secondary operation code
1 !       RQCB     - Address of block
1 !
1 ! Implicit Input:
1 !
1 !       None.
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       None.
1 !
1 ! Side effects:
1 !
1 !       Messages will be sent to remote nodes.
1 !
1 ! Routine value:
1 !
1 !       Status from comm primitive.
1 !--
1
2 BEGIN                                          ! Start of CLUSCOMM_SEND
2
2 LOCAL
2       BUFFER          : BLOCK [OPC$K_MAXMESSAGE+RQCB_K_SIZE+256, BYTE],
2       LEN             : LONG,
2       RQCBUF          : $ref_bblock,
2       PTR             : $ref_bblock,
2       FINAL_STAT      : LONG,
2       STATUS          : LONG;
2
2 !
2 ! If not in a cluster we are done, return with success
2 !
2 IF NOT .GLOBAL_STATUS [GBLSTS_K_IN_VAXcluster]
2 THEN
2     RETURN SS$_NORMAL;
2 !
2 ! First thing, make sure that it is an RQCB
2 !
2 IF .RQCB [RQCB_W_SIZE] NEQ RQCB_K_SIZE
2   OR
2     .RQCB [RQCB_B_TYPE] NEQ RQCB_K_TYPE
2 THEN
```

```
2       $signal_stop (OPC$_NOTRQCB);
2   !
2   ! Next thing, copy the entire RQCB to the buffer
2   !
2   RQCBUF = BUFFER [CLMRQCB_T_RQCB_OVERLAY];
2   CH$MOVE (RQCB_K_SIZE, .RQCB, .RQCBUF);
2   !
2   ! Take all of the character strings hanging off the RQCB and append them to
2   ! the end of the buffer.
2   !
2   PTR = BUFFER [CLMRQCB_T_TEXT];
2   IF .RQCBUF [RQCB_L_MCB] NEQ 0
2   THEN
3       BEGIN
3       LOCAL
3           MCB : $ref_bblock;
3       MCB = .RQCBUF [RQCB_L_MCB];
3       BUFFER [CLMRQCB_L_MCB_MSGID] = .MCB [MCB_L_MSGID];  ! Copy message id
3       BUFFER [CLMRQCB_L_MCB_STATUS] = .MCB [MCB_L_STATUS];!  and status
3       LEN = .MCB [MCB_L_TEXTLEN];
3       CH$MOVE (.LEN, .MCB [MCB_L_TEXTPTR], .PTR);          ! Copy the message
3       PTR = .PTR + .LEN;                                   ! Update the output pointer
3       RQCBUF [RQCB_L_MCB] = .LEN;                          ! Replace MCB address with text length
2       END;
2   IF (LEN = .RQCBUF [RQCB_L_OPER_LEN]) NEQ 0
2   THEN
3       BEGIN
3       CH$MOVE (.LEN, .RQCBUF [RQCB_L_OPER_PTR], .PTR);    ! Copy the message
3       PTR = .PTR + .LEN;                                   ! Update the output pointer
2       END;
2   IF (LEN = .RQCBUF [RQCB_L_TEXT_LEN]) NEQ 0
2   THEN
3       BEGIN
4       IF ((.RQCBUF [RQCB_W_MSGTYPE] EQLU MSG$_OPRQST) AND
4           (.RQCBUF [RQCB_B_RQSTCODE] EQLU OPC$_RQ_SECURITY))
3       THEN
3           RQCBUF [RQCB_L_TEXT_LEN] = 0                            ! Don't send raw messages for security alarm
3       ELSE
4           BEGIN
4           CH$MOVE (.LEN, .RQCBUF [RQCB_L_TEXT_PTR], .PTR);        ! Copy the message
4           PTR = .PTR + .LEN;                                       ! Update the output pointer
3           END;
2       END;
2   !
2   ! Zero any remaining address fields, to prevent embarrasing mixups on the remote node.
2   !
2   RQCBUF [RQCB_L_OCD] = 0;
2   RQCBUF [RQCB_L_OPER_PTR] = 0;
2   RQCBUF [RQCB_L_TEXT_PTR] = 0;
2   RQCBUF [RQCB_L_DSBLFLINK] = 0;
2   RQCBUF [RQCB_L_DSBLBLINK] = 0;
2   !
2   ! Put the cluster message header on top of the queue header of the RQCB
2   !
2   LEN = .PTR - BUFFER;                            ! Compute final length
2   BUFFER [CLM_B_RQSTCODE] = OPC$_X_CLUSMSG;
2   BUFFER [CLM_B_CLM_CODE] = .CLM_CODE;            ! Use the input argument
```

```
:  892          0884  2 BUFFER [CLM_B_DS_VERSION] = CLMRQCB_K_DS_VERSION;
:  893          0885  2 BUFFER [CLM_B_SW_VERSION] = OPC$K_SW_VERSION;
:  894          0886  2 BUFFER [CLM_W_LENGTH]    = .LEN;
:  895          0887  2 BUFFER [CLM_W_FILL_1]    = 0;
:  896          0888  2 BUFFER [CLM_L_CSID]      = .LCL_CSID;
:  897          0889  2 !
:  898          0890  2 ! Send it off to the designated target(s)
:  899          0891  2 !
:  900          0892  2 RETURN CLUSCOMM_SEND (.CSID, .LEN, BUFFER);
:  901          0893  1 END;                                              ! End of CLUSMSG_RQCB_SEND



                                                01FC 00000          .ENTRY   CLUSMSG_RQCB_SEND, Save R2,R3,R4,R5,R6,R7,-   ; 0770
                                                                             R8                                            :
                                5E      F66C  CE  9E 00002          MOVAB    -2452(SP), SP                                 :
                                04     0000G  CF  E8 00007          BLBS     GLOBAL_STATUS+1, 1$                           ; 0817
                                50        01      D0 0000C          MOVL     #1, R0                                        ; 0819
                                                  04 0000F          RET                                                    :
                                51        0C  AC  D0 00010 1$:      MOVL     RQCB, R1                                      ; 0823
                        0094    8F        08  A1  B1 00014          CMPW     8(R1), #148                                   :
                                          0C      12 0001A          BNEQ     2$                                            :
00000000G  8F        0A  A1     08            00  ED 0001C          CMPZV    #0, #8, 10(R1), #RQCB_K_TYPE                  ; 0825
                                          0E      13 00026          BEQL     3$                                            :
                                  00058264    8F  DD 00028 2$:      PUSHL    #361060                                       ; 0827
                   00000000G    00            01  FB 0002E          CALLS    #1, LIB$STOP                                  :
                                                  04 00035          RET                                                    :
                                56        0C  AE  9E 00036 3$:      MOVAB    BUFFER+12, RQCBUF                             ; 0831
                   66           61      0094  8F  28 0003A          MOVC3    #148, (R1), (RQCBUF)                          ; 0832
                                58      00A8  CE  9E 00040          MOVAB    BUFFER+168, PTR                               ; 0837
                                          6C  A6  D5 00045          TSTL     108(RQCBUF)                                   ; 0838
                                          20      13 00048          BEQL     4$                                            :
                                50        6C  A6  D0 0004A          MOVL     108(RQCBUF), MCB                              ; 0843
                        00A0    CE        2C  A0  D0 0004E          MOVL     44(MCB), BUFFER+160                           ; 0844
                        00A4    CE        28  A0  D0 00054          MOVL     40(MCB), BUFFER+164                           ; 0845
                                57        30  A0  D0 0005A          MOVL     48(MCB), LEN                                  ; 0846
                   68     34    B0            57  28 0005E          MOVC3    LEN, @52(MCB), (PTR)                          ; 0847
                                58            57  C0 00063          ADDL2    LEN, PTR                                      ; 0848
                          6C    A6            57  D0 00066          MOVL     LEN, 108(RQCBUF)                              ; 0849
                                57        7C  A6  D0 0006A 4$:      MOVL     124(RQCBUF), LEN                              ; 0851
                                          09      13 0006E          BEQL     5$                                            :
                   68   0080    D6            57  28 00070          MOVC3    LEN, @128(RQCBUF), (PTR)                      ; 0854
                                58            57  C0 00076          ADDL2    LEN, PTR                                      ; 0855
                                57      0084  C6  D0 00079 5$:      MOVL     132(RQCBUF), LEN                              ; 0857
                                          1B      13 0007E          BEQL     7$                                            :
                                08        2C  A6  B1 00080          CMPW     44(RQCBUF), #8                                ; 0860
                                          0C      12 00084          BNEQ     6$                                            :
                                07        52  A6  91 00086          CMPB     82(RQCBUF), #7                                ; 0861
                                          06      12 0008A          BNEQ     6$                                            :
                                        0084  C6  D4 0008C          CLRL     132(RQCBUF)                                   ; 0863
                                          09      11 00090          BRB      7$                                            :
                   68   0088    D6            57  28 00092 6$:      MOVC3    LEN, @136(RQCBUF), (PTR)                      ; 0866
                                58            57  C0 00098          ADDL2    LEN, PTR                                      ; 0867
                                          24  A6  D4 0009B 7$:      CLRL     36(RQCBUF)                                    ; 0873
                                        0080  C6  D4 0009E          CLRL     128(RQCBUF)                                   ; 0874
```

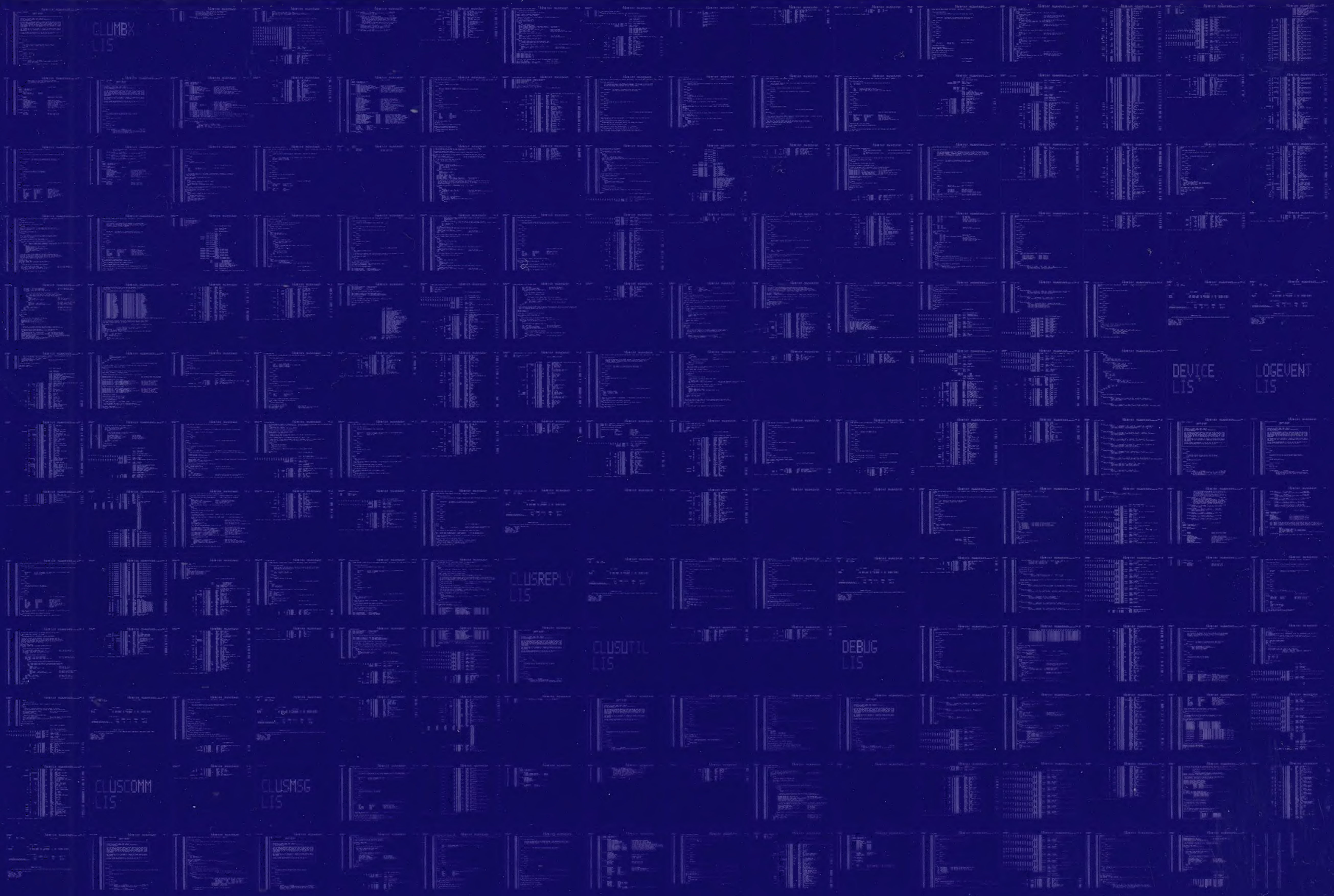
```
                                                                  D  7
OPC$CLUSMSG                                                      16-Sep-1984 01:21:35    VAX-11 Bliss-32 V4.0-742              Page  30
V04-000         CLUSMSG_RQCB_SEND (CSID, CLM_CODE, RQCB)         14-Sep-1984 12:50:37    [OPCOM.SRC]CLUSMSG.B32;1                    (9)

                                     0088    C6   7C 000A2         CLRQ     136(RQCBUF)                                       ; 0875
                                     0090    C6   D4 000A6         CLRL     144(RQCBUF)                                       ; 0877
                             50               6E   9E 000AA         MOVAB    BUFFER, R0                                        ; 0881
                   57        58               50   C3 000AD         SUBL3    R0, PTR, LEN                                      ;
                             6E               13   90 000B1         MOVB     #19, BUFFER                                       ; 0882
                       01    AE        08     AC   90 000B4         MOVB     CLM_CODE, BUFFER+1                                ; 0883
                       02    AE      0902     8F   B0 000B9         MOVW     #2306, BUFFER+2                                   ; 0884
                       04    AE               57   3C 000BF         MOVZWL   LEN, BUFFER+4                                     ; 0886
                       08    AE     0000G     CF   D0 000C3         MOVL     LCL_CSID, BUFFER+8                                ; 0888
                                     4080     8F   BB 000C9         PUSHR    #^M<R7,SP>                                        ; 0892
                                       04     AC   DD 000CD         PUSHL    CSID                                              ;
                     0000G   CF               03   FB 000D0         CALLS    #3, CLUSCOMM_SEND                                 ;
                                                   04 000D5         RET                                                        ; 0893

; Routine Size:  214 bytes,    Routine Base:  $CODE$ + 0467
```

```
1 GLOBAL ROUTINE CLUSMSG_STATE_SEND (CSID) =
1
1 !++
1 ! Functional description:
1 !
1 !       CLUSMSG_STATE_SEND sends the state of the current OPCOM process to a remote process.
1 !       The state consists of the active operators and active requests.
1 !
1 ! Input:
1 !
1 !       None.
1 !
1 ! Implicit Input:
1 !
1 !       None.
1 !
1 ! Output:
1 !
1 !       None.
1 !
1 ! Implict output:
1 !
1 !       None.
1 !
1 ! Side effects:
1 !
1 !       None.
1 !
1 ! Routine value:
1 !
1 !       None.
1 !--
1
2 BEGIN                                                   ! Start of CLUSMSG_STATE_SEND
2
2 LOCAL
2         RQCB            : $ref_bblock,                  ! RQCB data structure
2         OCD             : $ref_bblock,                  ! OCD data structure
2         NEXT_OCD        : $ref_bblock,                  ! ditto
2         OCD_COUNT       : LONG,                         ! Count of OCDs in list
2         EXIT_STATUS     : LONG,
2         STATUS          : LONG;
2
2 !
2 ! Loop through all requests, and send each of them off
2 !
2 EXIT_STATUS = TRUE;
2 INCR I FROM MIN_SCOPE TO MAX_SCOPE DO
3     BEGIN
3     !
3     ! For each each class of operator (SYSTEM, GROUP, USER) ...
3     !
3     NEXT_OCD = .OCD_VECTOR [(.I-1)*2];              ! Get first OCD in list
3     INCR J FROM 1 TO .OCD_VECTOR [(.I-1)*2+1] DO
4         BEGIN
4         !
4         ! For each OCD in the operator class list...
```

```
;  4              !
;  4              OCD = .NEXT_OCD;                                ! Get current OCD address
;  4              NEXT_OCD = .OCD [OCD_L_FLINK];                  ! Get next OCD address
;  4              RQCB = .OCD [OCD_L_RQSTFLINK];                  ! Get first request address
;  4              WHILE .RQCB NEQ OCD [OCD_L_RQSTFLINK] DO
;  5                  BEGIN
;  5                  !
;  5                  ! For each request in the OCD list...
;  5                  !
;  5                  IF NOT IMPLICITLY_CANCELED (.RQCB)
;  5                  THEN
;  5                      !
;  5                      ! The request is still good, send it off to the target(s)
;  5                      !
;  6                      IF NOT (STATUS = CLUSMSG_RQCB_SEND (.CSID, CLM__CHECK_REQUEST, .RQCB))
;  5                      THEN
;  5                          EXIT_STATUS = .STATUS;
;  5                  RQCB = .RQCB [RQCB_L_FLINK];                    ! Get next request address
;  4                  END;
;  3              END;
;  2          END;
;  2      !
;  2      ! After sweeping through the data base, we may have discovered some implicitly canceled requests and
;  2      ! implicitly disabled operators.  Process them now.  The requests should be done first, as yet more
;  2      ! implicitly disabled operators may turn up.
;  2      !
;  2      IMPLIED_CANCEL ();
;  2      IMPLIED_DISABLE ();
;  2      !
;  2      ! Send the list of operators off to the world.
;  2      !
;  2      INCR I FROM MIN_SCOPE TO MAX_SCOPE DO
;  3          BEGIN
;  3          !
;  3          ! For each each class of operator (SYSTEM, GROUP, USER) ...
;  3          !
;  3          NEXT_OCD = .OCD_VECTOR [(.I-1)*2];          ! Get first OCD in list
;  3          INCR J FROM 1 TO .OCD_VECTOR [(.I-1)*2+1] DO
;  4              BEGIN
;  4              !
;  4              ! For each OCD in the operator class list...
;  4              !
;  4              OCD = .NEXT_OCD;                        ! Get current OCD address
;  4              NEXT_OCD = .OCD [OCD_L_FLINK];          ! Get next OCD address
;  4              RQCB = .OCD [OCD_L_OPERFLINK];          ! Get first operator address
;  4              WHILE .RQCB NEQ OCD [OCD_L_OPERFLINK] DO
;  5                  BEGIN
;  5                  !
;  5                  ! Tell the world about this operator
;  5                  !
;  6                  IF NOT (STATUS = CLUSMSG_RQCB_SEND (.CSID, CLM__CHECK_OPERATOR, .RQCB))
;  5                  THEN
;  5                      EXIT_STATUS = .STATUS;
;  5                  RQCB = .RQCB [RQCB_L_FLINK];        ! Get next operator address
;  4                  END;
;  3              END;
;  2          END;
; 1017      1008  2
; 1018      1009  2 RETURN .EXIT_STATUS;
; 1019      1010  1 END;                                          ! End of CLUSMSG_STATE_SEND



                                       0FFC 00000          .ENTRY   CLUSMSG_STATE_SEND, Save R2,R3,R4,R5,R6,R7,-; 0894
                                                                    R8,R9,R10,R11                                :
                  5B 00000000G   8F    D0 00002            MOVL     #MAX_SCOPE, R11                              :
                  5A     0000G   CF    9E 00009            MOVAB    OCD_VECTOR-8, R10                            :
                  59             01    D0 0000E            MOVL     #1, EXIT_STATUS                              : 0940
       52 00000000G  8F          01    C3 00011            SUBL3    #1, #MIN_SCOPE, I                            : 0941
                                 4C    11 00019            BRB      6$                                           :
       50         52             01    78 0001B  1$:       ASHL     #1, I, R0                                    : 0946
                  57           6A40    D0 0001F            MOVL     OCD_VECTOR-8[R0], NEXT_OCD                   :
                  56        04 AA40    D0 00023            MOVL     OCD_VECTOR-4[R0], R6                         : 0947
                                 55    D4 00028            CLRL     J                                            :
                                 37    11 0002A            BRB      5$                                           :
                  53             57    D0 0002C  2$:       MOVL     NEXT_OCD, OCD                                : 0952
                  57             63    D0 0002F            MOVL     (OCD), NEXT_OCD                              : 0953
                  54        3C   A3    D0 00032            MOVL     60(OCD), RQCB                                : 0954
                  50        3C   A3    9E 00036  3$:       MOVAB    60(OCD), R0                                  : 0955
                  50             54    D1 0003A            CMPL     RQCB, R0                                     :
                                 24    13 0003D            BEQL     5$                                           :
                                 54    DD 0003F            PUSHL    RQCB                                         : 0960
            0000G  CF            01    FB 00041            CALLS    #1, IMPLICITLY_CANCELED                      :
                   15            50    E8 00046            BLBS     R0, 4$                                       :
                                 54    DD 00049            PUSHL    RQCB                                         : 0965
                                 05    DD 0004B            PUSHL    #5                                           :
                            04   AC    DD 0004D            PUSHL    CSID                                         :
            FED5   CF            03    FB 00050            CALLS    #3, CLUSMSG_RQCB_SEND                        :
                   58            50    D0 00055            MOVL     R0, STATUS                                   :
                   03            58    E8 00058            BLBS     STATUS, 4$                                   :
                   59            58    D0 0005B            MOVL     STATUS, EXIT_STATUS                          : 0967
                   54            64    D0 0005E  4$:       MOVL     (RQCB), RQCB                                 : 0968
                                 D3    11 00061            BRB      3$                                           : 0955
       C5          55            56    F3 00063  5$:       AOBLEQ   R6, J, 2$                                    : 0947
       B0          52            5B    F3 00067  6$:       AOBLEQ   R11, I, 1$                                   : 0941
            0000G  CF            00    FB 0006B            CALLS    #0, IMPLIED_CANCEL                           : 0977
            0000G  CF            00    FB 00070            CALLS    #0, IMPLIED_DISABLE                          : 0978
       52 00000000G  8F          01    C3 00075            SUBL3    #1, #MIN_SCOPE, I                            : 1001
                                 42    11 0007D            BRB      12$                                          :
       50          52            01    78 0007F  7$:       ASHL     #1, I, R0                                    : 0987
                   57          6A40    D0 00083            MOVL     OCD_VECTOR-8[R0], NEXT_OCD                   :
                   56       04 AA40    D0 00087            MOVL     OCD_VECTOR-4[R0], R6                         : 0988
                                 55    D4 0008C            CLRL     J                                            :
                                 2D    11 0008E            BRB      11$                                          :
                   53            57    D0 00090  8$:       MOVL     NEXT_OCD, OCD                                : 0993
                   57            63    D0 00093            MOVL     (OCD), NEXT_OCD                              : 0994
                   54       50   A3    D0 00096            MOVL     80(OCD), RQCB                                : 0995
                   50       50   A3    9E 0009A  9$:       MOVAB    80(OCD), R0                                  : 0996
                   50            54    D1 0009E            CMPL     RQCB, R0                                     :
                                 1A    13 000A1            BEQL     11$                                          :
                                 54    DD 000A3            PUSHL    RQCB                                         : 1001
                                 04    DD 000A5            PUSHL    #4                                           :
```

```
                                04    AC  DD 000A7          PUSHL    CSID                                    ;
              FE7B   CF               03  FB 000AA          CALLS    #3, CLUSMSG_RQCB_SEND                   ;
                     58               50  D0 000AF          MOVL     R0, STATUS                              ;
                     03               58  E8 000B2          BLBS     STATUS, 10$                             ;
                     59               58  D0 000B5          MOVL     STATUS, EXIT_STATUS                     ; 1003
                     54               64  D0 000B8  10$:    MOVL     (RQCB), RQCB                            ; 1004
                     DD               11     000BB          BRB      9$                                      ; 0996
          CF         55               56  F3 000BD  11$:    AOBLEQ   R6, J, 8$                               ; 0988
          BA         52               5B  F3 000C1  12$:    AOBLEQ   R11, I, 7$                              ; 0982
                     50               59  D0 000C5          MOVL     EXIT_STATUS, R0                         ; 1009
                                          04 000C8          RET                                              ; 1010

; Routine Size:  201 bytes,    Routine Base:  $CODE$ + 053D
; 1021           1011  1 END                                          ! End of module
; 1022           1012  0 ELUDOM




;                                   PSECT SUMMARY
;
;       Name                       Bytes                       Attributes
;
;  $CODE$                             1542  NOVEC,NOWRT,  RD ,  EXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)
;  $PLIT$                              380  NOVEC,NOWRT,  RD ,NOEXE,NOSHR,  LCL,  REL,  CON,NOPIC,ALIGN(2)




;                            Library Statistics
;
;                                           -------- Symbols --------        Pages        Processing
;       File                                Total    Loaded   Percent        Mapped       Time
;
;  _$255$DUA28:[SYSLIB]LIB.L32;1            18619         9         0         1000          00:01.8
;  _$255$DUA28:[OPCOM.OBJ]OPCOMLIB.L32;1      633        80        12           43          00:00.9




;                                    COMMAND QUALIFIERS

;       BLISS/CHECK=(FIELD,INITIAL,OPTIMIZE)/LIS=LIS$:CLUSMSG/OBJ=OBJ$:CLUSMSG MSRC$:CLUSMSG/UPDATE=(ENH$:CLUSMSG)

; Size:          1542 code + 380 data bytes
; Run Time:         00:31.5
; Elapsed Time:     01:36.6
; Lines/CPU Min:     1928
; Lexemes/CPU-Min: 15412
; Memory Used:  195 pages
; Compilation Complete
```

0289 AH-BT13A-SE DIGITAL EQUIPMENT CORPORATION
VAX/VMS V4.0 CONFIDENTIAL AND PROPRIETARY


CLUMBX
LIS

DEVICE
LIS

LOGEVENT
LIS

CLUSREPLY
LIS

CLUSUTIL
LIS

DEBUG
LIS

CLUSCOMM
LIS

CLUSMSG
LIS